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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,977	12/19/2001	Yukihiro Shibata	520.40997X00	1174

20457 7590 11/17/2005

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EXAMINER	
STOCK JR, GORDON J	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 11/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/020,977	SHIBATA ET AL.	
	Examiner	Art Unit	
	Gordon J. Stock	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-6,11,12,21,22,25 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-6,11,12,21,22,25 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The Amendment received August 22, 2005 has been entered into the record.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-2, 4, 5, 6, 11, 12, 21-22, 25-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Maeda et al. (5,774,222))—previously cited** in view of **Worster et al. (5,479,252))—previously cited** further in view of **Shibata et al. (JP 2000155099 A)** using machine translation and **Noguchi et al. (JP 2000105203 A)** using machine translation.

As for **claims 1, 2, 4, 5, 21,** Maeda in a method and apparatus for inspecting defects of patterns discloses the following: obtaining an image signal of a sample by imaging said sample through an objective lens of a bright field optical system (Fig. 1: 3, 9, 12a); adjusting optical conditions of said bright field optical system so as to decrease a difference of contrast, balancing first order and zeroth order intensities, among pattern signals; whereas, adjustment of the transmission ratio of diffracted light via a spatial filter, an attenuation filter and mask system; (col. 14, lines 45-65: Fig. 1: 14a, 14, 38)); wherein, the plurality of optical conditions are the illumination conditions (col. 14, lines 35-45) and the transmissivity of the attenuation filter (col. 14, lines 45-55); wherein, illumination conditions are selected such as illumination conditions (col. 21, lines 5-40), image signals are analyzed and evaluated (col. 21, lines 45-67) and other optical conditions are set such as type of attenuation (col. 22, lines 1-40); obtaining the image

signal of said sample under adjusted conditions by imaging said sample through objective lens (col. 22, lines 15-55; col. 23, lines 15-40); detecting a defect of said sample by processing the image signal (col. 7, lines 1-30; col. 8, lines 7-25); wherein, again, defects are detected via adjusting optical conditions (col. 23, lines 50-55); whereas, the transmission percentage of diffracted light is done via a spatial filter, attenuation filter, that is positioned near the Fourier transform plane and via a mask for controlling illumination (col. 9, lines 28-45: Fig. 1: 14a, 14, 38) with a selection of different transmission ratios for intensities are controlled with attenuation filter (col. 14, lines 55-60); illuminating a sample through an objective lens (Fig. 1: 3, 9); obtaining a plurality of images having different transmissions of zeroth order diffraction light through said objective lens by changing attenuation of zeroth order diffracted light; determining conditions and optimizing conditions of the transmission to increase sensitivity (col. 22, lines 25-65; col. 23, lines 15-40) and changing illumination conditions (col. 21, lines 5-40); obtaining the image signal of said sample under adjusted conditions by imaging said sample through objective lens (col. 22, lines 15-55; col. 23, lines 15-40); detecting a defect candidate of said sample by processing the image signal (col. 7, lines 1-30; col. 8, lines 7-25); whereas, brightfield illumination, annular looped illumination, is used (col. 31, line 42; Fig. 1); storing defect candidates (col. 2, lines 45-55).

As for repeatedly obtaining image signals of a same portion, Maeda does not explicitly state this but suggests it from having at least two images being obtaining through repeated inspection and through feed scanning (col. 9, lines 55-67) and through obtaining a plurality of image signals (col. 2, lines 55-56; Figs. 27a-27b; col. 7, lines 5-10; col. 9, lines 28-30; col. 9, lines 55-60, col. 13, lines 38-40). However, Worster in an inspection teaches repeatedly

obtaining images while scanning (col. 7, lines 30-35). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the inspection device repeatedly obtain images in order to have a complete portion of a wafer inspected such as one line of the wafer in the x-direction. In addition, Noguchi in a defect apparatus teaches obtaining a plurality of images at a plurality of different regions in order to analyze and differentiate the different regions of a wafer to determine defects that includes changing optical conditions (Drawings 1 and 2; paragraphs 0006, 0015, and 0016 of machine translation) and Shibata in a defect apparatus discloses observing several images to distinguish optical conditions for defect inspection (Drawings 1 and 2; paragraphs 0006-0008 of machine translation). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to evaluate a plurality of images of a plurality of regions of a wafer in order to determine adequate optical conditions for defect inspection when inspecting a specific region of the wafer.

As for **claim 6,** Maeda in view of Worster, Shibata, and Noguchi disclose everything as above (see claim 5). In addition, Maeda discloses illuminating a sample through an objective lens (Fig. 1: 3, 9); obtaining a plurality of images having different transmissions of zeroth order diffraction light through said objective lens by changing attenuation of zeroth order diffracted light; determining conditions and optimizing conditions of the transmission to increase sensitivity (col. 22, lines 25-65; col. 23, lines 15-40).

As for **claims 11, 12,** Maeda in an apparatus for inspecting defects discloses: a stage (Fig. 1: 2); an illuminating system with an objective lens (Fig. 1: 3, 9); an optical control unit which controls a transmission ratio of light, zeroth order diffracted, illuminated by said illuminating system and reflected so as to decrease a difference in contrast in an image signal among

segments corresponding to a plurality of regions on said sample (Fig. 1: 14, 14a, 38, and CPU); an imaging optical system, image detecting unit, and defect detecting section (Fig. 1: 8a, 8b, 13, 12a, 15a, 17, 20); contrast calculating unit (Fig. 38); whereas, brightfield illumination, annular looped illumination, is used (col. 31, line 42; Fig. 1); and analyzing unit/evaluation unit, CPU (col. 21, lines 45-67; Fig. 1: CPU); wherein, adjusting optical conditions of said bright field optical system so as to decrease a difference of contrast, balancing first order and zeroth order intensities, among pattern signals; whereas, adjustment of the transmission ratio of diffracted light via a spatial filter, an attenuation filter and mask system; (col. 14, lines 45-65: Fig. 1: 14a, 14, 38)); wherein, the plurality of optical conditions are the illumination conditions (col. 14, lines 35-45) and the transmissivity of the attenuation filter (col. 14, lines 45-55); wherein, illumination conditions are selected such as illumination conditions (col. 21, lines 5-40), image signals are analyzed and evaluated (col. 21, lines 45-67) and other optical conditions are set such as type of attenuation (col. 22, lines 1-40); obtaining the image signal of said sample under adjusted conditions by imaging said sample through objective lens (col. 22, lines 15-55; col. 23, lines 15-40); detecting a defect of said sample by processing the image signal (col. 7, lines 1-30; col. 8, lines 7-25); wherein, again, defects are detected via adjusting optical conditions (col. 23, lines 50-55); whereas, the transmission percentage of diffracted light is done via a spatial filter, attenuation filter, that is positioned near the Fourier transform plane and via a mask for controlling illumination (col. 9, lines 28-45: Fig. 1: 14a, 14, 38) with a selection of different transmission ratios for intensities are controlled with attenuation filter (col. 14, lines 55-60).

As for repeatedly obtaining image signals of a same portion, Maeda does not explicitly state this but suggests it from having at least two images being obtaining through repeated

inspection and through feed scanning (col. 9, lines 55-67) and through obtaining a plurality of image signals (col. 2, lines 55-56; Figs. 27a-27b; col. 7, lines 5-10; col. 9, lines 28-30; col. 9, lines 55-60, col. 13, lines 38-40). However, Worster in an inspection teaches repeatedly obtaining images while scanning (col. 7, lines 30-35). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the inspection device repeatedly obtain images in order to have a complete portion of a wafer inspected such as one line of the wafer in the x-direction. And Maeda does not explicitly state looking at images corresponding to a plurality of regions on said sample. However, Noguchi in a defect apparatus teaches obtaining a plurality of images at a plurality of different regions in order to analyze and differentiate the different regions of a wafer to determine defects that includes changing optical conditions (Drawings 1 and 2; paragraphs 0006, 0015, and 0016 of machine translation) and Shibata in a defect apparatus discloses observing several images to distinguish optical conditions for defect inspection (Drawings 1 and 2; paragraphs 0006-0008 of machine translation). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to evaluate a plurality of images of a plurality of regions of a wafer in order to determine adequate optical conditions for defect inspection when inspecting a specific region of the wafer.

As for **claims 22**, Maeda in view of Worster, Shibata, and Noguchi disclose everything as above (see **claim 21**). In addition, an optical condition is a polarization state of a light which illuminates said sample in the step of obtaining (col. 10, lines 10-15; Figs. 37-38).

As for **claims 25,** Maeda in an apparatus for inspecting defects discloses: an optical control unit, an adjustment unit, which controls a transmission ratio of light illuminated by said illuminating system and reflected (Fig. 1: 14, 14a, and 38); an imaging optical system, image

detecting unit, and defect detecting section (Fig. 1: 8a, 8b, 13, 12a, 15a, 17, 20); contrast calculating unit (Fig. 38) and analyzing unit/evaluation unit, CPU (col. 21, lines 45-67); adjusting optical conditions of said bright field optical system so as to decrease a difference of contrast, balancing first order and zeroth order intensities, among pattern signals; whereas, adjustment of the transmission ratio of diffracted light via a spatial filter, an attenuation filter and mask system; (col. 14, lines 45-65: Fig. 1: 14a, 14, 38)); wherein, the plurality of optical conditions are the illumination conditions (col. 14, lines 35-45) and the transmissivity of the attenuation filter (col. 14, lines 45-55); wherein, illumination conditions are selected such as illumination conditions (col. 21, lines 5-40), image signals are analyzed and evaluated (col. 21, lines 45-67) and other optical conditions are set such as type of attenuation (col. 22, lines 1-40).

As for repeatedly obtaining image signals of a same portion, Maeda does not explicitly state this but suggests it from having at least two images being obtaining through repeated inspection and through feed scanning (col. 9, lines 55-67) and through obtaining a plurality of image signals (col. 2, lines 55-56; Figs. 27a-27b; col. 7, lines 5-10; col. 9, lines 28-30; col. 9, lines 55-60, col. 13, lines 38-40). However, Worster in an inspection teaches repeatedly obtaining images while scanning (col. 7, lines 30-35). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the inspection device repeatedly obtain images in order to have a complete portion of a wafer inspected such as one line of the wafer in the x-direction. In addition, Noguchi in a defect apparatus teaches obtaining a plurality of images at a plurality of different regions in order to analyze and differentiate the different regions of a wafer to determine defects that includes changing optical conditions (Drawings 1 and 2; paragraphs 0006, 0015, and 0016 of machine translation) and Shibata in a

defect apparatus discloses observing several images to distinguish optical conditions for defect inspection (Drawings 1 and 2; paragraphs 0006-0008 of machine translation). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to evaluate a plurality of images of a plurality of regions of a wafer in order to determine adequate optical conditions for defect inspection when inspecting a specific region of the wafer.

As for **claim 26,** Maeda in view of Worster, Shibata, and Noguchi disclose everything as above (see **claim 25**). In addition, an optical condition is a polarization state of a light which illuminates said sample in the step of obtaining (col. 10, lines 10-15; Figs. 37-38).

Response to Arguments

4. Applicant's arguments with respect to the claims as cited in Remarks of August 22, 2005 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: **(571) 273-8300**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs
November 13, 2005

Gregory J. Toatley, Jr.
Supervisory Patent Examiner
Art Unit 2877

14 Nov 05